

WHAT IS CLAIMED IS:

1. Device A device for the automatic opening and closing of reaction vessels, comprising:
  - holding device (16) for the non-rotatable holding of one or more reaction vessels;  
(13)
    - a gripper (11) for the gripping of a lid (12) for the reaction vessel (13), wherein the gripper (11) has gripping jaws (20, 34) effective to take hold of the lid (12), and the gripper has no active operating device for opening and closing the gripping jaws, and
    - a rotating mechanism (10), for rotatable holding of the gripper (11); wherein characterised in that  
the gripping jaws (20, 34) are arranged in such a way so that, when the lid (12) is inserted into the area between the gripping jaws (20, 34), it is held by the gripping jaws (20, 34) through frictional contact, and the gripper (11) has no active operating device for opening and closing the gripping jaws (20, 34).
2. Device The device according to claim 1, wherein characterised in that the gripping jaws (20, 34) have insertion slopes. (27, 39).
3. Device The device according to claim 1, wherein characterised in that  
the gripping jaws (20, 34) have on their gripping surfaces (25, 37) one or more cutting webs (28) running at right-angles to the direction of rotation.
4. Device The device according to claim 3, wherein characterised in that  
the height by which the cutting web (28) projects beyond the gripping surface (25, 37) is less than the wall thickness of the reaction vessels. (13) and preferably not greater than 0.5 mm.

5. Device The device according to any of claims claim 1 to 4, wherein characterised in that the holding device (16) has a clamping mechanism to clamp and hold the reaction vessels (13).

6. Device A device for the automatic opening and closing of reaction vessels in particular according to any of claims claim 1 to 5, comprising:

a holding device (16) for the non-rotatable holding of one or more reaction vessels; (13)

a gripper (11) for the gripping of a lid (12) for the reaction vessel (13), wherein the gripper (11) has gripping jaws (20, 34) effective to take hold of the lid (12); and

a rotating mechanism (10), for rotatable holding of the gripper (11); wherein characterised in that

the holding device (16) has three perforated plates (41, 44, 45), arranged one above the other, and with each of the perforated plates having the plurality of openings (43) to hold the reaction vessels (13), wherein the top and bottom perforated plates (41, 44) are arranged so as to be stationary, with the openings (43) made in them in the top and bottom perforated plates being flush with one another, and the middle perforated plate (45) is designed to slide capable of sliding between a first position in which its the openings in the middle perforated plate (43) are aligned with the openings of the other top and bottom perforated plates, and a second position in which its the openings (43) are arranged somewhat offset relative to the openings (43) of the other perforated top and bottom perforated plates, so that a reaction vessel (13) inserted in the openings (43) of the perforated plates (41, 44, 45) is immobilized clamped, and

that means (51) of for fixing the middle perforated plate (45) in the second position are provided.

7. Device The device according to claim 6, wherein

characterised in that the middle perforated plate (45) is mounted so as to slide in only one a single direction, the direction of sliding.

8. Device The device according to claim 7, wherein

characterised in that the openings (43) in the direction of sliding are wider than those at right-angles to the direction of sliding.

9. Device The device according to claim 7 or 8, wherein

characterised in that each of the openings (43) of the middle perforated plate (45) contains a plurality of projection projections (50) which extends each extending into the interior of the an opening (43) and is each projection being located roughly in the section area between a centre line of the opening (43) concerned running in the direction of sliding, and the edge of the opening (43).

10. Device The device according to claim 9, wherein  
characterised in that each of the openings (43) of the top and/or bottom perforated plate (41, 44) contains a plurality of projection projections (50) which extends each extending into the interior of the an opening (43) and is arranged diametrically opposite the projections projection (50) of the corresponding opening of the middle perforated plate (45).

11. Device The device according to any of claims claim 6 to 10, further comprising  
characterised in that means for moving and fixing (51) the middle perforated plate (45) in the second position are provided.

12. Robot with A robot, comprising:  
a work platform (2);  
one or more handling arms (5, 6, 7); and  
characterised by a device according to any of claims claim 1 to 11, wherein one handling arm (7) is provided with the rotating mechanism (10) for rotatable holding of the gripper (11).

13. Robot The robot according to claim 11, further comprising  
characterised in that there is provided on the work platform a mount on a work platform for non-rotatable mounting of the holding device (16), for example by means of a locating device.